UNIVERSITY OF BUEA

P.O. Box 63,

Buea, South West Region

CAMEROON

Tel : (237) 3332 21 34/3332 26 90

Fax: (237) 3332 22 72

REPUBLIC OF CAMEROON

PEACE-WORK-FATHERLAND

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER ENGINEERING

COURSE: CEF 440 - Internet Programming and Mobile Programming

TASK2: REQUIREMENT GATHERING of the biometric student's attendance app

Presented by

GROUP 5

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COURSE INSTRUCTOR: Dr. NKEMENI VALERY

GROUP MEMBERS

NAMES	MATRICULES	SPECIALITY
KENNE DATEWO SUZY MAIVA	FE21A214	Software
SIAHA TOUKO AUBIN	FE21A304	Software
DJEUNOU DJEUNOU MARIEKE JETTIE	FE21A168	Network
TSAPZE ZAMBOU ROSELINE CYNTHIA	FE21A328	Software
MATHO SONKWA HESTIE MAYELLE	FE21A438	Software

ABSTRACT

This report focuses on the development of a biometric student attendance application. The aim is to streamline the attendance tracking process in educational institutions by leveraging biometric technology, specifically fingerprint recognition. The project involves gathering requirements which has been achieved through surveys, interviews, and brainstorming sessions with students and lecturers. The identified requirements guide the development process, ensuring a user-friendly mobile application that integrates advanced fingerprint recognition algorithms. The application will simplify attendance tracking, eliminate manual recording, and provide accurate and secure attendance records.

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INTRODUCTION

In today's educational landscape, accurate and efficient attendance tracking is paramount for educational institutions. Conventional methods of attendance taking often prove to be time-consuming and prone to errors. To address this challenge, our project focuses on the development of a user-friendly mobile application for biometric student attendance using fingerprint recognition. The application will streamline the attendance process, eliminate manual recording, and provide accurate and secure attendance records. This report outlines the requirements gathered through surveys, interviews, and brainstorming sessions, focusing on the integration of fingerprint biometrics integration. By leveraging advanced fingerprint recognition algorithms, the mobile application will simplify and improve the efficiency of attendance tracking in educational institutions. The identified requirements will guide the development process, ensuring a solution that is user-friendly, accurate, and adaptable to meet the specific needs of educational institutions, revolutionizing attendance tracking and enhancing the overall educational environment.

In the subsequent sections, we will present the requirements gathered from our thorough analysis and discussions. These requirements will serve as a roadmap for the development process, guiding the design, implementation, and testing phases. By focusing on user-friendliness, accuracy, and adaptability in utilizing fingerprint biometrics, our goal is to create a biometric student's attendance mobile application that revolutionizes attendance tracking and contributes to a more efficient and effective educational environment.

1. OBJECTIVE AND GOAL

1.1. Objective

The objective of the requirement gathering phase is to identify, record, and rank the essential requirements for creating a user-friendly mobile application for Biometric attendance. Through a thorough approach, we aim to involve stakeholders, comprehend their needs, and convert these insights into actionable requirements. This process will form the basis for the subsequent stages of the project, ensuring that we have a comprehensive understanding of stakeholder expectations, technological needs, and usability factors. Ultimately, our objective is to establish a strong foundation for developing a solution that caters to the varied needs of our target users.

1.2. Goal

This mobile application leverages fingerprint recognition technology to create a secure and reliable system for students to mark their attendance. Students will benefit from a convenient and user-friendly interface, dropping the need for physical attendance sheets. Instructors gain the advantage of real-time attendance tracking, allowing them to watch student participation effectively and identify any discrepancies promptly. The application is designed for scalability and customization, catering to various class sizes and institutional needs. Additionally, the application prioritizes security, employing robust measures to protect student data, particularly sensitive biometric information.

The primary goals of biometric attendance Mobile are as follows:

- Automate the process of recording student attendance using biometric authentication.
- Improve accuracy and reliability by dropping manual entry errors and proxy attendance.
- Provide real-time attendance data for effective monitoring and reporting.
- Enhance security by using biometric identifiers to verify student identity.

2. IDENTIFYING STAKEHOLDERS

Stakeholder identification is an essential step in the development of any project, particularly in the realm of technology. Stakeholders are individuals or groups who have a vested interest in the project's success and may be affected by its outcomes. Identifying and understanding these stakeholders is crucial for ensuring that their needs, concerns, and expectations are adequately addressed throughout the project lifecycle. For the purpose of this project, stakeholders can be categorized as follows:

2.1. Internal Stakeholders

Internal stakeholders are individuals or groups that are directly associated with the project. They have a direct interest in the success of the project and are typically involved in its planning, execution, and management. The internal stakeholders for this project are as follows;

1. **App Development Team:** This includes developers and UI/UX designers who are directly involved in creating the app but may not be end users themselves.
2. **Educational Institutions:** This group comprises school/college administrators and the IT department, who are responsible for overseeing the implementation of the app within the educational institution.

2.2. External Stakeholders:

External stakeholders are individuals or groups that exist outside of the organization but have an interest or influence in the project's outcomes. The external stakeholders for this project are as follows;

1. **End Users:** They are the primary beneficiaries of the app's functionality and they are those who will directly interact with the app on a regular basis. They include

   - *Instructors*
   - *Students*
   - *Administrative Staff*

2. **Financial Stakeholders:** Potential investors may have a stake in the project's success and provide funding for its development and implementation. They might primarily be Educational Institutions.

3. REQUIREMENT GATHERING METHODS

Requirement gathering methods are essential in the initial phase of software development, aiding in the identification and documentation of stakeholder needs and expectations. These methods encompass various approaches, from traditional techniques like interviews and surveys to modern methodologies such as prototyping and user stories. Each method offers unique insights into understanding user requirements, enabling project teams to effectively capture, analyze, and document essential features and functionalities. The methods used for the purpose of this project are as follows;

3.1. Brainstorming Sessions

Our project team utilized brainstorming sessions to collect requirements for the software. In these sessions, team members shared ideas, discussed user needs, and identified potential features collaboratively. Through open dialogue and creative thinking, we generated a diverse range of ideas and insights to inform the development process efficiently.

3.2. Survey

Surveys involve creating questionnaires that are distributed to a target audience to gather feedback and opinions. Surveys can provide quantitative data by asking closed-ended questions concerning their preferences regarding such an app. This was done using *Microsoft forms*. The following figures shows in feedback details with an average filling time of 05:24 minutes for 15 answers.

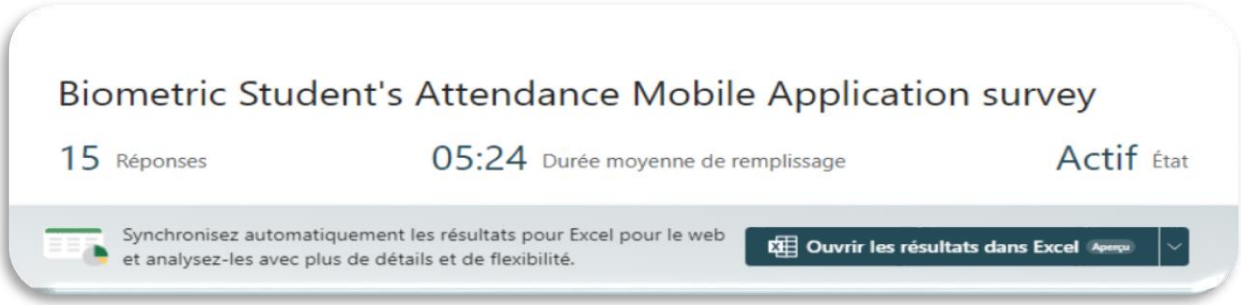


Figure 1: Survey interface

- From the survey, about 93% of the answers come from students and 7% from neither student nor lecturer. Also, the students come from diverse faculties and universities such as University of Buea and University of Yaounde

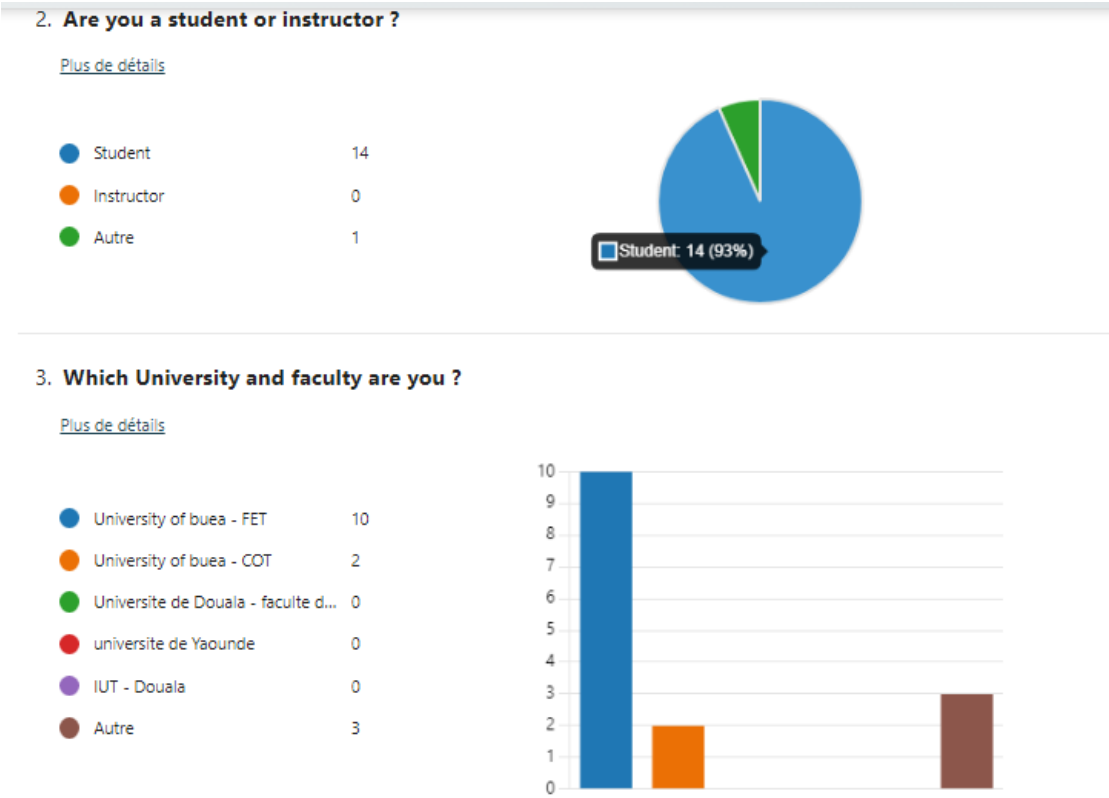


Figure 2: Reponse statistics 1

- Others:

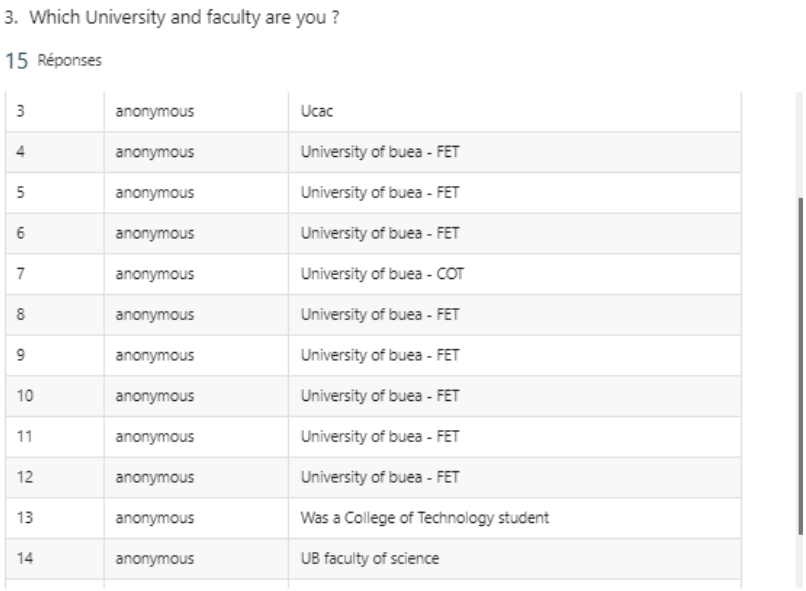


Figure 3: Response Statistic 2

- 81% of the respondents would prefer that the app to be deployed both on iOS and Android operating systems

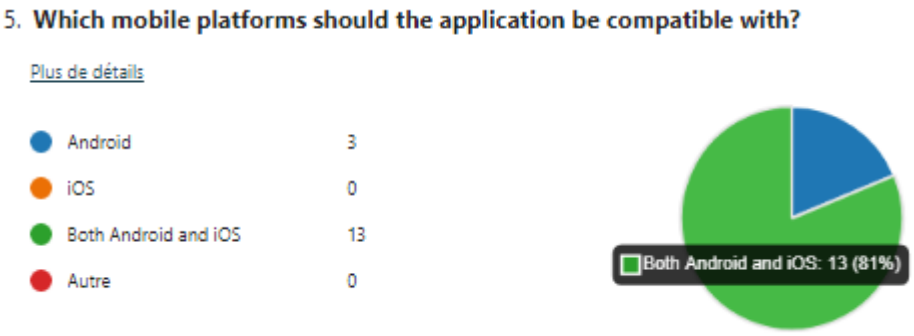


Figure 4: Response statistics 3

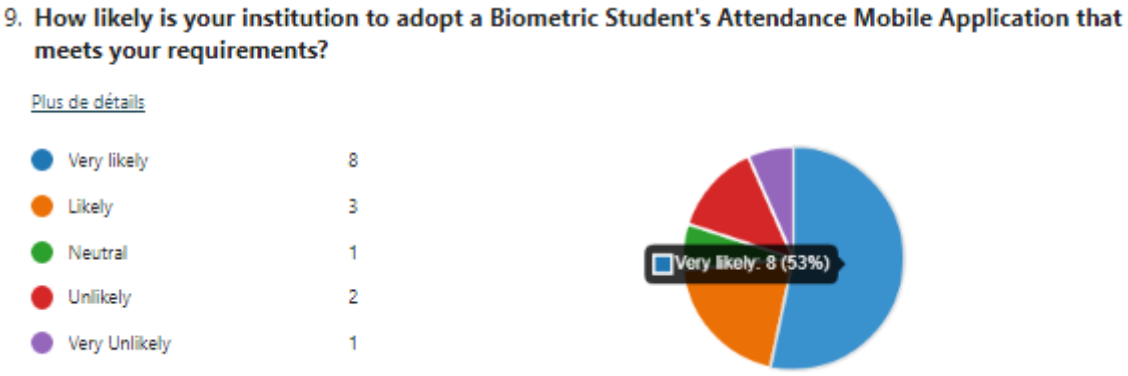
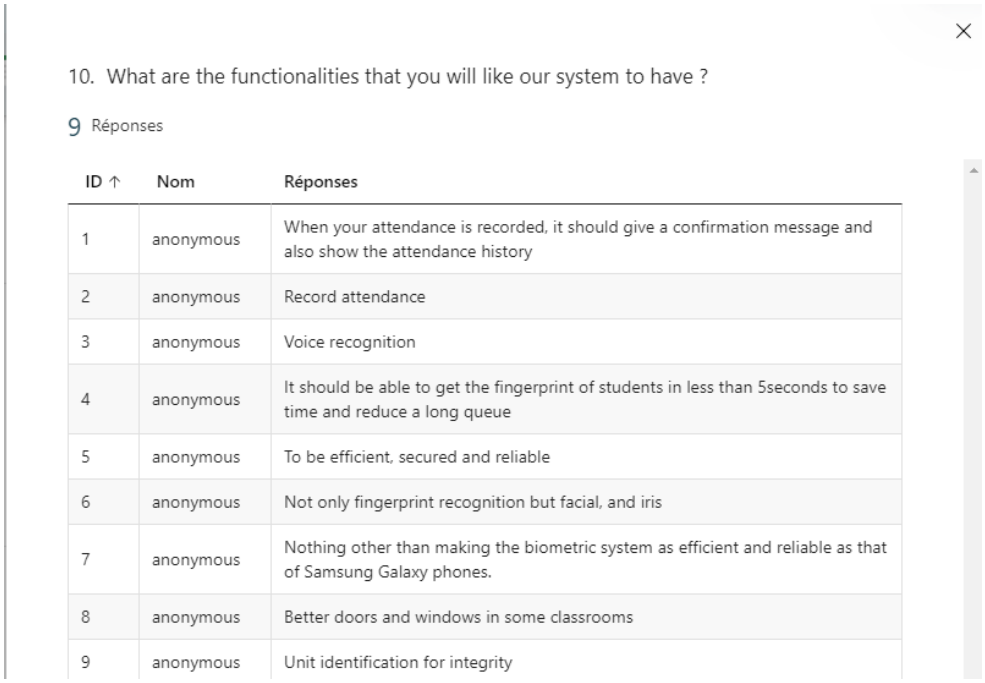


Figure 5: Response statistics 4

- Functionalities they will like the most to see in the app are shown in the following figure



10. What are the functionalities that you will like our system to have ?

9 Réponses

ID ↑	Nom	Réponses
1	anonymous	When your attendance is recorded, it should give a confirmation message and also show the attendance history
2	anonymous	Record attendance
3	anonymous	Voice recognition
4	anonymous	It should be able to get the fingerprint of students in less than 5seconds to save time and reduce a long queue
5	anonymous	To be efficient, secured and reliable
6	anonymous	Not only fingerprint recognition but facial, and iris
7	anonymous	Nothing other than making the biometric system as efficient and reliable as that of Samsung Galaxy phones.
8	anonymous	Better doors and windows in some classrooms
9	anonymous	Unit identification for integrity

Figure 6: Response Statistics 5

11. **Are there any additional features or requirements you would like to see / be able to do in the Biometric**

Plus de détails

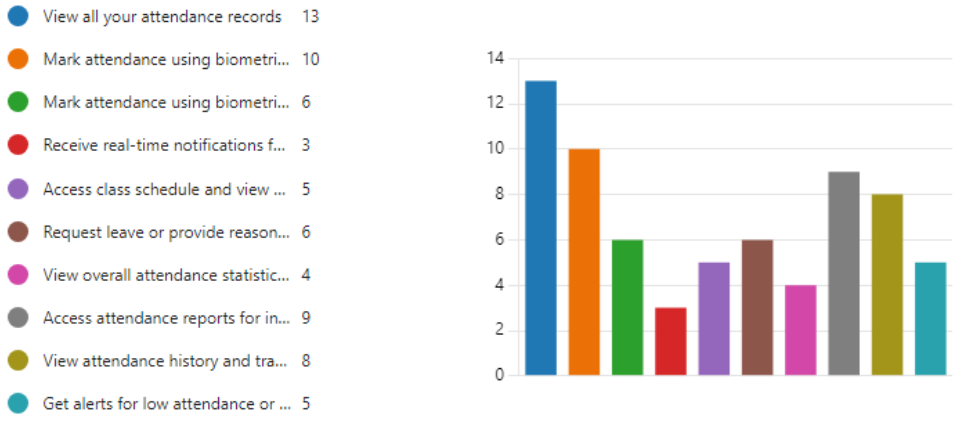


Figure 7: Response statistics 6

3.3. Interviews

There are one-on-one conversations with individual users or stakeholders. They allow for more in-depth discussions and provide qualitative insights. A student and two lecturers were interviewed through WhatsApp calls, and face-to-face conversation. The requirements or needs gathered here will be discussed in the next topic.

4. USER PERSONA

A user persona is a fictional character representing the typical traits, goals, and behaviors of a specific user group. It helps teams understand users' needs and design products or services tailored to their preferences. After gathering all the requirements discussed in the previous topic, we could come out with a user persona described below;

- **Name:** Professor NGOBO Jacques
- **Demographics:**
  - Age: 40
  - Gender: Male
  - Occupation: Assistant Professor
  - Education: Holds a Ph.D. in Electrical Engineering
- **Background:** Professor NGOBO Jacques is a dedicated educator with years of experience in academia. He teaches undergraduate and graduate courses in electrical engineering, specializing in digital signal processing.
- **Goals:**
  1. **Efficient Class Management:** Professor NGOBO aims to efficiently manage attendance records for his classes to monitor student participation and engagement.
  2. **Ensuring Academic Integrity:** He wants to ensure the accuracy and integrity of attendance tracking to maintain academic standards and fairness.
  3. **Ease of Use:** Professor NGOBO seeks a user-friendly platform that simplifies attendance recording and minimizes administrative overhead.
- **Needs:**
  1. **Simple Attendance Management:** He needs a straightforward system for recording and tracking student attendance, saving time and effort during class sessions.

2. **Reliable Biometric Authentication:** Professor NGOBO values a reliable biometric authentication system to accurately verify students' identities and prevent attendance fraud.

3. **Notification of Low Attendance:** He requires alerts for low attendance to address potential issues promptly and intervene when necessary.

- **Pain Points:**

1. **Manual Attendance Tracking:** Professor NGOBO finds manual attendance tracking cumbersome and time-consuming, detracting from valuable instructional time.

2. **Concerns About Accuracy:** He worries about the accuracy and reliability of traditional attendance methods, such as paper-based systems or roll calls.

3. **Complex Systems:** Professor NGOBO struggles with complex attendance systems that require extensive training or technical expertise to use effectively.

- **Preferences:**

1. **Efficiency:** Professor NGOBO prefers tools and technologies that streamline administrative tasks and allow him to focus more on teaching and research.

2. **User-Friendly Interface:** He values intuitive interfaces that are easy to navigate, reducing the learning curve and ensuring widespread adoption among faculty members.

3. **Data Security:** Professor NGOBO prioritizes data security and privacy, especially when it comes to handling sensitive information such as attendance records and biometric data.

By understanding Professor NGOBO’s needs, pain points, and preferences, we can design a student biometric attendance mobile app that meets his requirements and enhances his teaching experience without serving as a communication medium

5. GATHERED REQUIREMENTS

5.1. Requirements from Surveys

Following are the various needs gathered from stakeholders after discussing with them through the survey;

- **Low Attendance Alerts:** Receive instant alerts for low attendance to address potential issues promptly, ensuring students' regularity and engagement.

- **View Attendance Records:** Easily access and review detailed attendance records for individual students, promoting transparency and accountability.

- **Request Leave of Absence:** Allow students to submit leave requests conveniently within the app, streamlining the process and maintaining accurate attendance records.

- **Real-Time Notifications:** Receive immediate notifications upon attendance updates or any relevant events, enabling timely responses and effective communication.

- **Biometric Attendance:** Implement biometric authentication for accurate and secure attendance tracking, enhancing reliability and preventing fraudulent activities.

- **Confirmation Messages:** Provide instant confirmation messages upon successful attendance marking, ensuring students and staff are aware of their attendance status.

- **Voice Recognition:** Enable voice recognition for attendance marking, offering an alternative and accessible method for users, enhancing user experience and inclusivity.

- **Fast Service**: Ensure fast response times and seamless navigation within the app, optimizing user experience and satisfaction.

- **Reliability:** Guarantee consistent and dependable performance of the app, fostering trust among users and stakeholders in its functionality and data accuracy.

5.2. Requirements from Interviews

Following are the various needs gathered from stakeholders after discussing with them through interviews;

- **Timetable Availability:** Providing a feature permitting users with the ability the view their respective timetables; whether instructor, student, or administrative staff.

- **Attendance File:** Providing a feature to download attendance at the end of each class with information such as date, time, course, level, department.
- **Effective User Experience:** Providing a system which is easy to use with little or no stress.
- **Facial recognition:** Providing users with the ability to mark attendance by authenticating with their facial pattern.
- **Authentication System:** Using an authentication system placed in front of classes instead o of using tablets.

5.3. Requirements from Brainstorming

Following are the additional requirements gathered after brainstorming sessions within the project team;

- **Login and Sign Up**: Enable users to create accounts or log in securely, ensuring personalized access to attendance records and features while safeguarding sensitive information.
- **Multilanguage Support**: Provide language options to accommodate diverse user preferences and facilitate broader accessibility, enhancing inclusivity and user satisfaction across different linguistic backgrounds.

CONCLUSION

In conclusion, this report highlights the outcomes of the development of a biometric student attendance mobile application. Through a thorough requirement gathering phase that involved in-person and online interviews, surveys, and extensive research, we have successfully identified the essential needs and expectations of stakeholders. The focus of the application is to streamline the attendance tracking process in educational institutions using biometric technology, specifically fingerprint recognition. By incorporating advanced fingerprint recognition algorithms, the application aims to simplify attendance tracking, eliminate manual recording, and provide accurate and secure attendance records. The comprehensive nature of our endeavors, from stakeholder analysis to requirement elicitation and prioritization, ensures that the final application meets the specific requirements of the educational environment.

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